

Examining Risk and Protective Factors for Alcohol Use in Lesbian, Gay, Bisexual, and Transgender Youth: A Longitudinal Multilevel Analysis

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ABSTRACT. Objective: Lesbian, gay, bisexual, and transgender (LGBT) youth are at increased risk for alcohol misuse, but little is known about the psychosocial and demographic factors that are associated with these differences over time. The purpose of this study was to investigate change in alcohol use across development. We aimed to describe group/demographic differences in alcohol use, the effects of psychosocial variables on drinking within persons (i.e., psychological distress, sexual orientation–based victimization, and perceived family support), and the interactions between demographic differences and longitudinal psychosocial variables in predicting rates of alcohol use. **Method:** The current study used data from the longest running longitudinal study of LGBT youth. Hierarchical linear modeling was used to examine both demographic differences and psychosocial predictors of alcohol use in an ethnically diverse sample of 246 LGBT youth (ages 16–20 years at baseline) across five time points over 2.5 years. **Results:** Drinking increased

significantly over time in a linear fashion, although it tended to increase more rapidly among male LGBT youth compared with females. Analyses of group differences revealed lower average rates of drinking for African American and female LGBT youth, and there were no differences between bisexual youth and gay/lesbian youth. Psychological distress and sexual orientation–based victimization were associated with increased alcohol use at each wave of data collection for female LGBT youth only. Perceived family support at each wave was negatively associated with alcohol use for all LGBT youth. **Conclusions:** Findings indicate that there is significant heterogeneity in the etiological pathways that lead to alcohol use in LGBT youth and that correlates of drinking are similar to those found in general populations. These crucial findings indicate that existing alcohol interventions also may be effective for LGBT youth and open up a wider array of prevention and treatment options for this at-risk population. (*J. Stud. Alcohol Drugs*, 73, 783–793, 2012)

ALCOHOL MISUSE AND ALCOHOL USE disorders have a profound impact at both the individual and societal levels (Grant et al., 2004; Mohapatra et al., 2010; Rehm et al., 2010; World Health Organization, 2003, 2010). Nationally and worldwide, alcohol misuse burdens our health care, economic, and criminal justice systems. Ample research demonstrates that the earlier the age is at drinking onset, the higher the risk is for developing alcohol use disorders, in large part because of disruption of normal neurocognitive development and its subsequent effects on learning

and memory, emotion regulation, and executive functioning (De Bellis et al., 2005; Nagel et al., 2005; Parada et al., 2012; Zeigler et al., 2005).

Lesbian, gay, bisexual, and transgender (LGBT) individuals are at increased risk for both alcohol misuse and alcohol use disorders (Cochran et al., 2004; Garofalo et al., 1998; Hatzenbuehler et al., 2008; Marshal et al., 2008, 2009; Stall et al., 2001). Moreover, the gender gap in drinking found in the general population (i.e., that men drink more on average than women) seems to be significantly less pronounced within LGBT youth and adult populations (Hughes, 2005; Marshal et al., 2008; Substance Abuse and Mental Health Services Administration, 2009). Among youth, LGBT young people report earlier initiation and steeper drinking trajectories into young adulthood than heterosexual youth (Garofalo et al., 1998; Hatzenbuehler et al., 2008; Marshal et al., 2009).

Recent longitudinal studies have revealed marked individual heterogeneity in alcohol use trajectories within LGBT youth (Hatzenbuehler et al., 2008; Marshal et al., 2009). Lesbian and bisexual young women tend to drink more than heterosexual young women, but they do not differ in the acceleration of drinking over time, whereas gay and bisexual young men initially do not differ from heterosexual young

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men in rates of drinking but accelerate at a more rapid pace. Additionally, there is evidence that bisexual young people drink at the highest rates compared with both exclusively gay/lesbian and heterosexual youth. These nationally representative surveys are advantageous in terms of generalizability, but these random samples usually have small numbers of LGBT youth that limit the ability to look at subgroup differences. Furthermore, they do not assess constructs that adequately capture experiences of LGBT youth that may be associated with drinking (e.g., sexual orientation–based victimization). Longitudinal studies of community samples of LGBT youth provide a more nuanced picture of group differences in predictors of alcohol use that may be addressed through interventions with this at-risk population.

According to minority stress theory, LGBT individuals are at increased risk for developing adverse health outcomes because they experience numerous chronic, socially based stressors (e.g., prejudice, victimization; Meyer, 2003). Hatzenbuehler's (2009) extension of minority stress theory suggests that LGBT individuals develop deficits in emotion regulation because of this chronic stress, which promotes negative affect. To cope with these negative mood states, LGBT individuals may turn to maladaptive coping behaviors (e.g., alcohol use). Consequently, it is important to consider multiple psychosocial risk factors and protective factors to fully understand the development of alcohol misuse and other negative health outcomes in LGBT youth.

Little research has been conducted to explain variability in drinking within LGBT youth. In general samples, dimensions of negative affectivity, especially depression, have been linked to increased alcohol use in adolescents (e.g., Elkins et al., 2006; Hussong and Chassin, 1994; Rohde et al., 1996). Alcohol misuse also has been associated with several dimensions of victimization, including witnessing, experiencing, or perpetrating violence (Berenson et al., 2001; Brady et al., 2008; Kilpatrick et al., 2000; Sullivan et al., 2006). Among LGBT youth, some research has linked victimization to alcohol and substance use (Bontempo and D'Augelli, 2002), but null findings also have been reported (Russell et al., 2011).

In addition, research has identified factors that protect adolescents in the general population against alcohol misuse (Hawkins et al., 1992), and family support is one of the most robust of these protective factors (Barnes et al., 1995, 2000; Wills and Cleary, 1996). African American adolescents also consistently report lower rates of drinking compared with other racial groups (Kilpatrick et al., 2000; Substance Abuse and Mental Health Services Administration, 2009). These young people likely experience certain sociocultural conditions that protect them against drinking, and some research indicates that the influence of family structure and parental monitoring on preventing substance use is particularly strong in African American youth (Catalano et al., 1992; Gillmore et al., 1990). Consistent with the ecological framework

provided by minority stress theory, it is important to examine the constellation of factors that predict alcohol use, in conjunction with key demographic variables, to determine whether they exact a different profile of risk for LGBT youth.

The current study aimed to longitudinally investigate a variety of theoretically selected risk factors and protective factors for alcohol use among youth. Specific aims of the current study included investigation of the following: (a) trajectories of alcohol use across development, including linear and nonlinear change; (b) group differences in alcohol use based on gender (birth sex female vs. male), race (African American vs. other), self-identified sexual orientation (bisexual vs. gay), age at baseline, and initial drinking status; (c) longitudinal effects of psychosocial variables on drinking within persons (i.e., psychological distress, sexual orientation–based victimization, and perceived family support); and (d) the interactions between group differences and longitudinal psychosocial variables in predicting rates of alcohol use.

We hypothesized that alcohol use would increase across the 2.5-year follow-up and that African American LGBT youth would drink less on average than other racial groups. We expected that bisexual youth would drink more than those who identified themselves as gay, lesbian, or other. We anticipated no differences in drinking by gender, unlike what research has typically found in heterosexual youth. We also anticipated that youth who were older and drank more at baseline would drink more across all waves. Based on minority stress theory, we hypothesized that sexual orientation–based victimization and psychological distress would be associated with increased drinking and that perceived family support would be negatively associated with drinking. Finally, previous research has identified group differences in both initial rates of drinking and trajectories of drinking over time between subgroups within the LGBT youth population (e.g., based on gender and self-reported sexual orientation) and suggests that longitudinal predictors may have different impacts depending on subgroup affiliation. Because of the dearth of research that uses moderating or mediating analyses in studies of alcohol use among LGBT youth, we made no specific hypotheses about the interactions between group differences and longitudinal psychosocial factors in predicting alcohol use in this sample.

Method

Participants

The participants were 246 LGBT youth from the Chicago area (ages 16–20 years at baseline). The mean age of the sample at baseline was 18.31 years ($SD = 1.32$), and 31.0% were younger than age 18. See Table 1 for a description of the sample at baseline.

TABLE 1. Description of lesbian, gay, bisexual, and transgender youth sample at baseline ($N = 246$)

Variable	n (%)
Birth sex	
Male	121 (49.2)
Female	125 (50.8)
Sexual identity	
Male	107 (43.5)
Female	119 (48.4)
Male-to-female transgender	12 (4.9)
Female-to-male transgender	8 (3.3)
Sexual orientation	
Gay	83 (34.0)
Lesbian	68 (27.9)
Bisexual	70 (28.7)
Questioning/unsure/other	23 (9.4)
≥2 Changes in sexual orientation label, across all waves	69 (28.1)
≥3 Changes in sexual orientation label, across all waves	30 (12.2)
Race/ethnicity	
White/Caucasian	34 (13.8)
Black/African American	141 (57.3)
Hispanic/Latino(a)	28 (11.4)
Other	43 (17.5)
Living situation	
Living with parents	146 (59.8)
Other stable housing	86 (34.5)
Unstable housing	14 (5.7)
Highest level of education	
College	14 (5.7)
Partial college	55 (22.5)
High school	64 (26.2)
Partial high school	98 (40.2)
Less than high school	13 (5.3)

Procedure and design

The study used an accelerated longitudinal design involving a small range in age at enrollment and longitudinal follow-up on five occasions over 2.5 years (Tonry et al., 1991). Participants were recruited using a modified respondent-driven sampling approach (see Heckathorn, 1997) that involved an initial convenience sample (38%) and subsequent waves of incentivized peer recruitment (62%). Participants were paid between \$25 and \$40 for their participation at each time point, and they completed self-report measures on health, mental health, victimization, and health behaviors. The institutional review board approved the project.

Data for this analysis were taken from five waves of data collection (2007–2011; baseline and follow-up at 6, 12, 18, and 30 months) with 87%, 91%, 83%, and 77% retention at each follow-up visit, respectively. Note that retention rates are specific to each follow-up wave individually and are not cumulative.

Measures

Demographics. A baseline demographics questionnaire assessed the following participant characteristics: age, sex,

race/ethnicity, and self-reported sexual orientation identity label. Additionally, self-reported sexual orientation was assessed at each of the follow-up waves to monitor change in identity over time. Biological birth sex (as opposed to current gender identity) was used to assess participant sex because our goal was to evaluate biological differences in alcohol use.

Alcohol use. Frequency and quantity of alcohol use were assessed for the 6 months before each interview. For individuals who endorsed lifetime use of alcohol, an item was administered evaluating the number of days participants consumed alcohol during the assessment period (frequency [range: 0–180]), and an additional item evaluated the amount used on average while drinking (quantity [1 = *one drink* to 6 = *six or more drinks*]). Participants indicating no lifetime use were coded as “0” for both the frequency and quantity items. A quantity/frequency (QF) variable was calculated by multiplying the number of days during which alcohol was consumed by the average amount consumed per episode (Bartholow and Heinz, 2006; Greenfield, 2000). Alcohol QF was used in the current study instead of examining quantity or frequency alone for the following reasons: (a) to maximize reliability of self-report (given the difficulty in estimating the total number of drinks consumed over 6 months) and (b) to avoid making assumptions about the average number of drinks consumed per drinking occasion. The QF variable used in the present study may be conceptualized as an approximation of the total number of drinks consumed in the past 6 months.

Multidimensional Scale of Perceived Social Support (Zimet et al., 1990). The Multidimensional Scale of Perceived Social Support is a measure of social support that includes subscales for various dimensions of perceived support. The multifactor structure of the scale has been supported with confirmatory factor analysis (Canty-Mitchell and Zimet, 2000). The family support subscale was used for the current analysis, and this subscale demonstrated adequate internal consistency across all five waves (Cronbach’s α ranged from .87 to .90).

Sexual orientation–based victimization. A 10-item measure based on the work of D’Augelli et al. (1998) assessed the frequency of experiences with victimization “because you are, or were thought to be, gay, lesbian, bisexual, or transgender” during the 6 months before each wave. Items addressed verbal threats/insults, being chased, having property damaged, and being physically or sexually assaulted. Frequency ratings ranged from *never* (coded 0) to *three or more times* (coded 3). A composite variable was created by calculating the mean of all items. Previous research using this composite variable has demonstrated adequate internal consistency in a sample of LGB youth ($\alpha = .76$; Waldo et al., 1998), and our previous work has demonstrated the utility of using this measure as a composite variable (Liu and Mustanski, 2012). The Cronbach’s α in our sample ranged from .77 to .93 across all five waves.

Brief Symptom Inventory (BSI 18; Derogatis, 2000). Self-reported psychological distress was assessed at all waves with the Global Severity Index of the BSI 18, a self-report measure of psychological distress during the previous week. The BSI 18 has been widely used as a psychiatric screening tool in clinical settings and epidemiological studies. Previous reports found the BSI 18 to have adequate reliability and convergent validity with the longer version and with related measures (Zabora et al., 2001). Internal consistency was high in this sample: Cronbach's α ranged from .91 to .95 across all waves.

Analyses

Analyses were conducted using Hierarchical Linear Modeling (HLM) statistical software (Raudenbush and Bryk, 2002). HLM is designed to account for dependency in observations in data that contain a nested or multilevel structure. In this case, longitudinal predictors of alcohol use (Level 1) are nested within participants with certain demographic characteristics (Level 2). At Level 1, HLM estimates the longitudinal within-participant main effects of predictors of alcohol use (e.g., psychological distress). At Level 2, HLM allows for the analysis of the main effects of differences between participants (e.g., birth sex). Also at Level 2, between-subjects characteristics can be evaluated as moderators of Level 1 effects (e.g., the moderating effect of birth sex on the association between psychological distress and alcohol use). Maximum likelihood estimation was used to model alcohol QF as the dependent variable, and estimates are from the population-average model using robust standard errors.

Results

The participants reported a mean of 15.67 ($SD = 28.01$) drinking days during the 6 months before each wave (frequency), and the mean number of drinks consumed on drinking days was 2.41 ($SD = 1.85$). The mean age at drinking onset was 15.12 years ($SD = 2.77$), and 6.8% of the participants were abstainers throughout the study. Across all waves, the participants reported mean scores of 0.42 ($SD = 0.64$; range: 0–3) for sexual orientation–based victimization, 0.75 ($SD = 0.71$; range: 0–4) for psychological distress, and 4.47 ($SD = 1.68$; range: 1–7) for perceived family support. Intercorrelations between study variables are reported in Table 2.

In HLM, we first ran an unconditional (null) model of alcohol QF with no predictor variables entered at Level 1 or Level 2 to evaluate the extent to which variability in the dependent variable was attributable to individual/group differences (between-subjects characteristics) or change over time (within-persons factors). The intraclass correlation coefficient in the unconditional model was .51, indicating that

TABLE 2. Intercorrelations between study variables

Variable	Alcohol QF	Victimization	Psychol. distress	Family support
Alcohol QF	–	.047	.118*	-.153*
Victimization		–	.258*	-.167*
Psychol. distress			–	-.314*
Family support				–

Notes: QF = quantity/frequency; psychol. = psychological.

*Significant bivariate correlations, $p < .05$.

approximately 51% of the variance in alcohol consumption was attributable to between-subjects characteristics and 49% was attributable to longitudinal within-subjects factors.

Group differences in alcohol consumption (Level 2 main effects)

Estimates of all main and moderating effects from the full model are shown in Table 3. Across all waves, African American LGBT youth reported significantly less alcohol use compared with all other racial groups (coefficient = -49.46 , $p < .01$). African American participants drank approximately 50 units fewer on the alcohol QF variable, which is just under one half of a standard deviation less than the average amount of alcohol use in all other racial groups combined. Additionally, the participants who were born female drank significantly less on average than those who were born male (coefficient = -34.25 , $p < .05$), although this effect was not as strong as the effect of participant race (less than one third of a standard deviation lower than males). There were no differences in alcohol QF by self-reported sexual orientation at baseline (bisexual vs. gay: coefficient = -12.54 , $p = .436$). Similarly, there was no difference when measuring self-reported sexual orientation as a time-varying effect (i.e., within-persons changes in identity: coefficient = -8.12 , $p = .531$). Alcohol use also did not differ significantly by participant age at baseline (coefficient = 4.01 , $p = .137$), but youth with higher alcohol QF at baseline drank more across all waves compared with those with lower initial drinking status (coefficient = 0.64 , $p < .001$).

There were few group differences in age at drinking onset and abstaining across all waves of data collection. Age at baseline was positively associated with age at drinking onset ($r = .24$, $p < .001$). Participants who were younger at baseline reported an earlier age at drinking onset. There were no group differences in age at drinking onset by race, $t(235) = -0.71$, $p = .476$, for African American versus other; birth sex, $t(235) = -0.03$, $p = .978$; or self-reported sexual orientation at baseline, $t(235) = .84$, $p = .403$, for bisexual versus gay. Age at baseline also was significantly associated with abstaining across all waves, $t(244) = 3.22$, $p < .01$. The participants who were younger at baseline

TABLE 3. Summary of main and moderating effects on alcohol quantity/frequency

Fixed effect	Coeff. value	SE	<i>t</i> ratio	<i>df</i>	<i>p</i>
Intercept	105.02	19.12	5.49	240	<.001*
Race	-49.46	17.91	-2.76	240	.006*
Birth sex	-34.25	14.31	-2.39	240	.017*
Sexual orientation	-12.54	16.05	-0.78	240	.436
Age at baseline	4.01	3.08	1.19	240	.137
Initial drinking status	0.64	0.03	19.82	240	<.001*
Psychological distress	-2.13	13.98	-0.15	971	.879
Race	2.57	15.54	0.17	971	.869
Birth sex	32.38	14.29	2.27	971	.024*
Sexual orientation	5.27	13.37	0.39	971	.694
Victimization	-13.09	10.58	-1.24	971	.217
Race	0.39	11.53	0.03	971	.973
Birth sex	34.72	12.89	2.69	971	.007*
Sexual orientation	0.97	12.14	0.08	971	.936
Family support	-15.45	5.89	-2.62	971	.009*
Race	3.60	6.00	0.60	971	.549
Birth sex	3.89	4.86	0.80	971	.424
Sexual orientation	4.92	5.37	0.92	971	.360
Bisexuality longitudinal	-8.12	12.95	-0.63	971	.531
Estimation of variance	<i>SD</i>	Variance component	<i>df</i>	χ^2	<i>p</i>
Random effect, μ_j	88.23	7,784.80	240	1,067.83	<.001

Note: Coeff. = coefficient.

*Significant main or moderating effects, $p < .05$.

were more likely to abstain across all waves. There were no group differences in abstaining across all waves by race, $\chi^2(1, N = 246) = 1.56, p = .212$, birth sex, $\chi^2(1, N = 246) = 0.20, p = .658$, or self-reported sexual orientation at baseline, $\chi^2(1, N = 246) = 1.86, p = .172$.

Trajectories of alcohol use (change over time)

A Level 1 random-slope model was tested next to evaluate slope heterogeneity, which would indicate that the relation between Level 1 variables (i.e., risk and protective factors) and the outcome variable are different between individuals. Age at each wave of data collection was used to evaluate this slope effect. Alcohol QF increased significantly with age for the sample as a whole (coefficient = 13.02, $p < .05$), and the chi-square test of the Level 1 random effect was significant, $\chi^2(245, N = 246) = 317.96, p < .001$, indicating that slopes of change in alcohol use differed between individuals. A quadratic term (i.e., Age \times Age) was added to evaluate for the presence of nonlinear growth. The quadratic term was not significant (coefficient = $-.85, p = .430$), indicating that growth was better described as linear.

Next, we added several key variables (i.e., participant birth sex, race, self-reported sexual orientation, age at baseline, and baseline alcohol QF) as moderators of slope of alcohol use to test for group differences in change in alcohol use over time. The moderating effect of birth sex on the slope of alcohol use showed a trend toward significance

(coefficient = $-11.02, p = .08$). The initial rates of alcohol use were lower in male-born participants, but they tended to increase at a higher rate over time (Figure 1). Neither race (coefficient = $-4.10, p = .518$) nor self-reported sexual orientation (coefficient = $5.51, p = .394$) moderated the slope of alcohol use. Age at baseline did not significantly moderate the slope of change (coefficient = $-1.71, p = .459$), suggesting that there were no systematic differences in growth by age at enrollment. Finally, alcohol QF at baseline moderated the slope of change (coefficient = $0.52, p < .001$). The participants with lower initial drinking status experienced a steeper increase in drinking than those with higher initial drinking status.

Longitudinal correlates of alcohol consumption (Level 1 main effects)

Psychological distress was not longitudinally associated with alcohol QF within persons (coefficient = $-2.13, p = .879$). Similarly, sexual orientation-based victimization in the 6 months before each wave of data collection was not associated with changes in alcohol consumption in this sample (coefficient = $-13.09, p = .217$). However, perceived family support was significantly negatively associated with alcohol use within persons over time (coefficient = $-15.45, p < .01$). Across all participants, alcohol QF decreased by 0.20 of a standard deviation for every 1-unit increase in perceived family support.

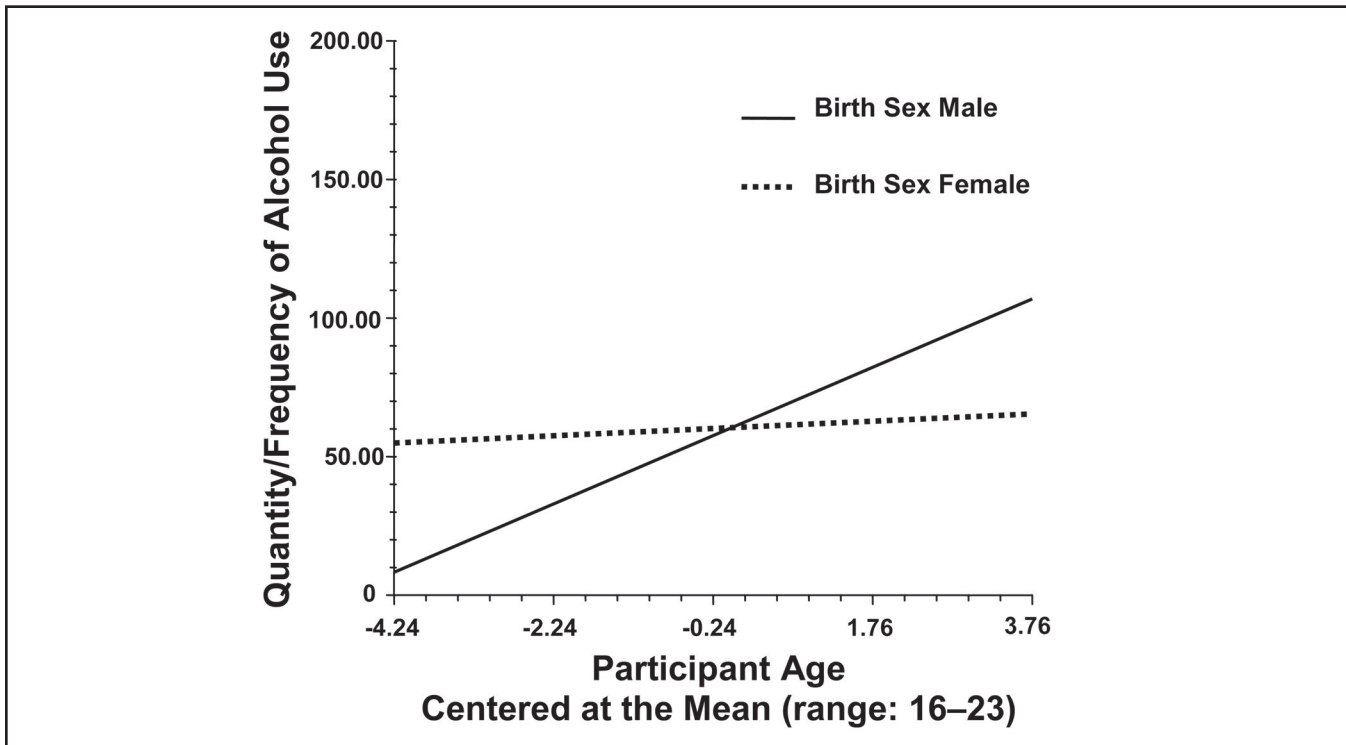


FIGURE 1. Trajectories of alcohol use over time, split by birth sex. *Note:* We restricted the range of alcohol quantity/frequency to 0–200 to increase interpretability.

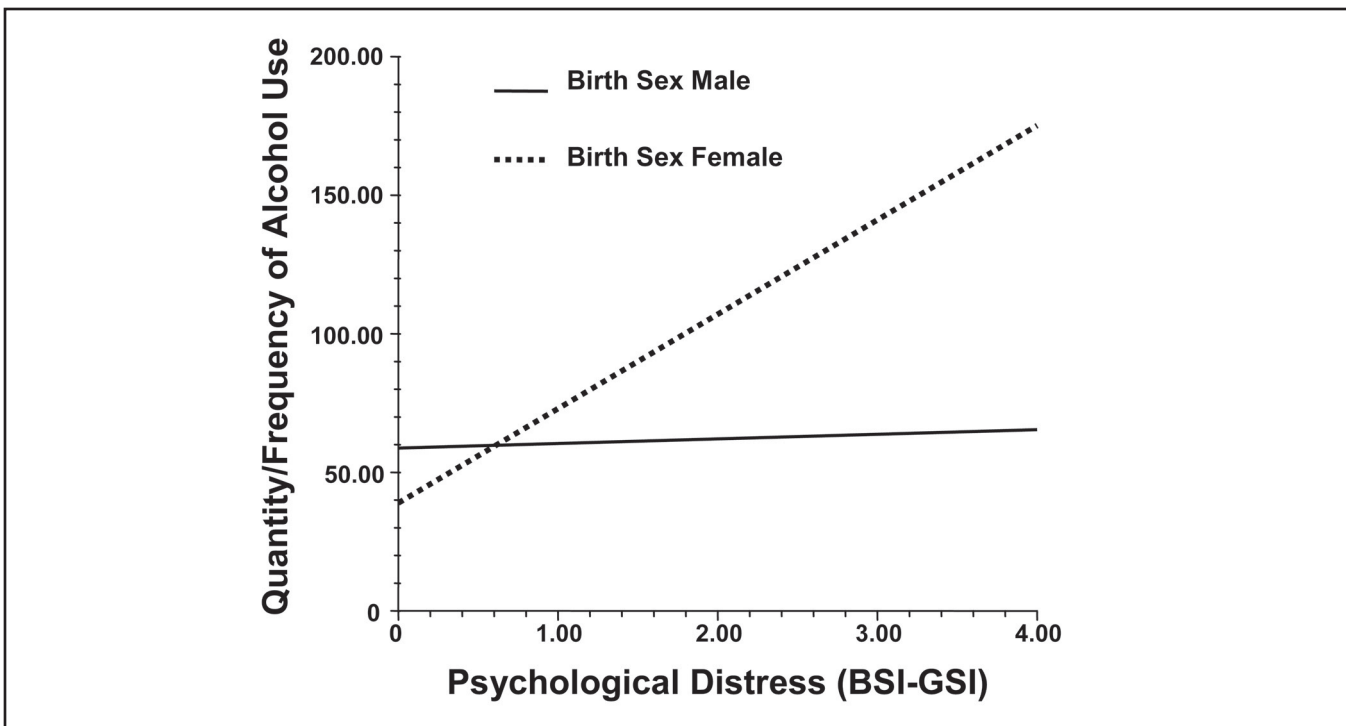


FIGURE 2. Moderating effect of birth sex on the association between psychological distress and alcohol use. *Notes:* We restricted the range of alcohol quantity/frequency to 0–200 to increase interpretability. BSI-GSI = Brief Symptom Inventory–Global Severity Index.

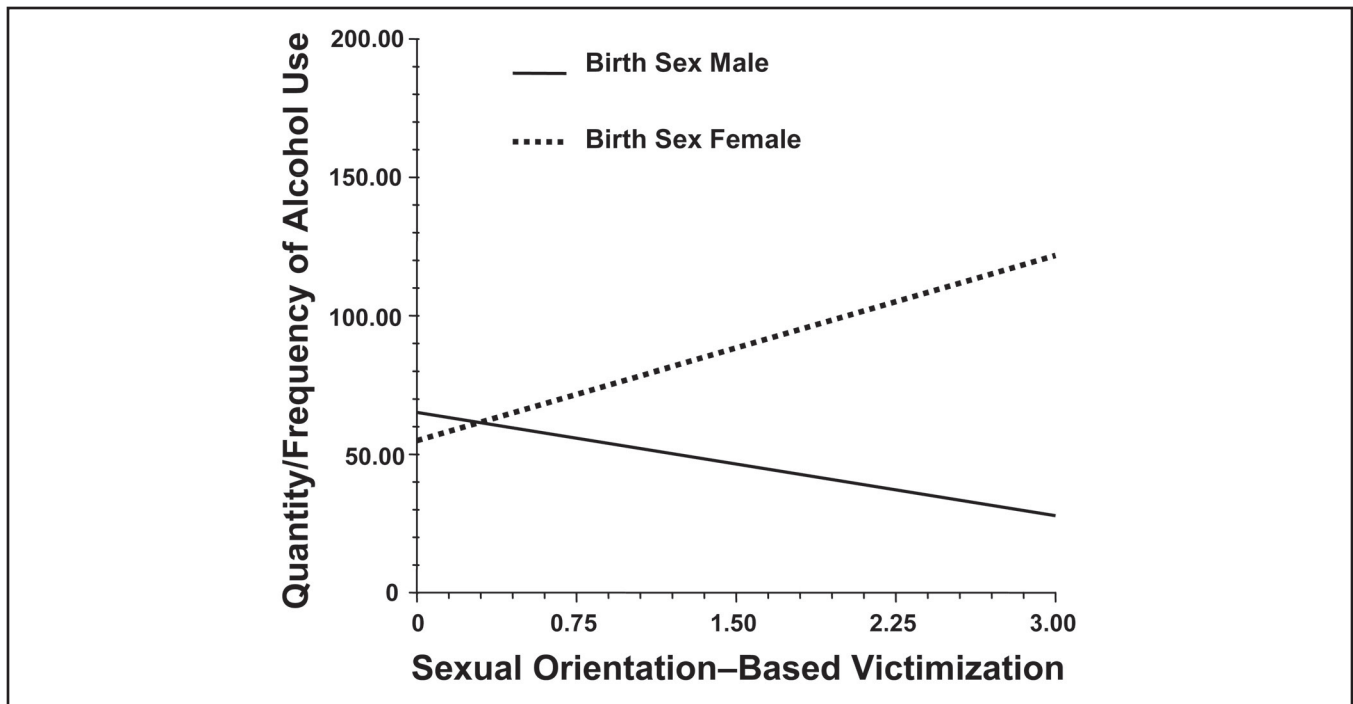


FIGURE 3. Moderating effect of birth sex on the association between victimization and alcohol use. *Note:* We restricted the range of alcohol quantity/frequency to 0–200 to increase interpretability.

Cross-level interactions (moderating effects of Level 2 variables on Level 1 effects)

The current analysis revealed several significant cross-level interactions (i.e., moderating effects) of demographic or group differences on longitudinal predictors of alcohol QF. Birth sex was a significant moderator of the main effect of psychological distress on alcohol use (coefficient = 32.38, $p < .05$). The positive association between psychological distress and alcohol QF was stronger in female participants (Figure 2). Neither race (coefficient = 2.57, $p = .869$) nor self-reported sexual orientation at baseline (coefficient = 5.27, $p = .694$) was a significant moderator of this same main effect.

Birth sex also was a significant moderator of the main effect of sexual orientation-based victimization on alcohol QF (coefficient = 34.72, $p < .01$), and the positive association between victimization experiences and drinking was stronger in female participants (Figure 3). Neither race (coefficient = .39, $p = .973$) nor self-reported sexual orientation at baseline (coefficient = .97, $p = .936$) significantly moderated the association between sexual orientation-based victimization and alcohol QF. The main effect of perceived family support on alcohol consumption was not significantly moderated by any between-subjects characteristics, including race (coefficient = 3.60, $p = .549$), birth sex (coefficient = 3.89, $p = .424$), and self-reported sexual orientation at baseline (coefficient = 4.92, $p = .360$).

We ran three follow-up analyses on the full model to test for model robustness. First, we Winsorized alcohol QF at three standard deviations from the mean to reduce the influence of outliers (3.1% of scores were above three standard deviations from the mean). The overall pattern of results was unaltered, but two of the effects described above moved from significance at $p < .05$ to trends: the main effect of birth sex on alcohol use (coefficient = -21.67, $p = .08$) and the moderating effect of birth sex on the association between psychological distress and alcohol use (coefficient = 20.17, $p = .08$). Second, we re-ran the full model with an overdispersed Poisson distribution to account for nonnormality in the distribution of the outcome and an overpreponderance of cases with the value zero. The overall pattern of results was unaltered, and all statistically significant effects at $p < .05$ remained significant. Finally, we tested the missing-at-random assumption by evaluating the correlation between the outcome and missingness. The correlation between baseline alcohol QF and the number of missing data points across the five waves was nonsignificant ($r = .09$, $p = .159$).

Discussion

The current study examined how rates and trajectories of drinking differ between subgroups of LGBT youth and identified group-specific risk and protective processes for alcohol use over time. Notably, the overall pattern of results for correlates of alcohol use is strikingly similar to that iden-

tified by previous research on drinking in general samples of adolescents and adults. Little research has been conducted looking at longitudinal predictors of drinking among LGBT youth, and the patterning of findings indicates that similar, yet culturally sensitive, intervention strategies also might be efficacious. This finding is important as well, because previous research indicates that the gender gap in drinking in the general population is much less pronounced among LGBT individuals (Hughes, 2005). Consequently, the risk factors and protective factors for drinking among females in the general population have been assumed to differ from those of lesbian and bisexual women.

Overall, alcohol use increased over time for the sample as a whole in a linear fashion, but there was significant heterogeneity in trajectories of use that was explained by the moderating effects of several group differences. Growth tended to increase more rapidly for male LGBT youth despite lower initial rates of drinking compared with females, and female LGBT youth drank less on average across all waves. Rates of drinking also were significantly lower in African American LGBT youth compared with those of all other racial groups. However, the drinking trajectories of that subgroup did not differ, their alcohol use remained lower longitudinally, and they did not differ in terms of age at drinking onset or likelihood of abstaining across all waves. Age at baseline did not influence rates of drinking or longitudinal growth in drinking. The participants who were younger at baseline were more likely to abstain across all waves but also reported earlier age at drinking onset. These findings suggest that younger participants may differ from their older counterparts in exposure to drinking at earlier ages but that these social and developmental influences did not affect drinking trajectories. However, alcohol use increased more sharply among individuals with lower initial drinking status, suggesting that LGBT youth who drank more at baseline had less room to grow or may have regressed to the mean (note that baseline alcohol QF was not associated with attrition). There were no differences in alcohol use or drinking trajectories by self-reported sexual orientation (bisexual vs. other).

Psychosocial risk factors (i.e., psychological distress and sexual orientation-based victimization) were not associated with rates of alcohol use in the same manner for all subgroups of LGBT youth: Females had stronger positive associations between both variables and alcohol use compared with males. These findings are consistent with earlier research on alcohol use in adult women that pointed to the role of stressful life events (e.g., victimization experiences) in the development of distress and alcohol-related problems (Beckman, 1975; Blume, 1986; Jones, 1971). However, the causal role of these stressful life events has been questioned, and instead it has been suggested that women are actually more likely to experience victimization while drinking (Nolen-Hoeksema, 2004).

Minority stress theory would predict that victimization experiences, psychological distress, and alcohol misuse would co-occur among LGBT youth (Hatzenbuehler, 2009; Meyer, 2003). Although these variables were not interrelated in the sample as a whole, victimization experiences and psychological distress were associated with higher rates of drinking among female-born youth. This finding is reconcilable with minority stress theory because youth who experience multiple minority roles (e.g., being born female and having same-gender attractions) may be particularly vulnerable to developing negative health outcomes. However, African American LGBT youth also experience multiple minority roles, and these youth drank significantly less compared with all other racial groups. This pattern is consistent with prior studies showing fewer mental health problems among LGBT African Americans, compared with Whites (Meyer et al., 2008; Mustanski et al., 2010). Research suggests that African American youth have certain resources that help to protect them against alcohol misuse, such as parental monitoring, attachment to parents, and tight-knit family structures (Catalano et al., 1992; Gillmore et al., 1990), although the current findings indicate that they do not differ from other racial groups in the association between perceived family support and drinking. The current findings suggest that African American LGBT youth also may benefit from the presence of these other familial resources, despite evidence that African American communities on average have less favorable attitudes toward homosexuality compared with White Americans (Glick and Golden, 2010).

That perceived family support was negatively associated with alcohol use is of particular importance to promoting health in LGBT youth. Loss of support from family members is not uncommon among LGBT youth and may lead to increased alcohol use and other negative health outcomes. However, as societal attitudes change, family-based intervention strategies are becoming an increasingly viable avenue for preventing negative health outcomes in this population (Garofalo et al., 2008). Families that are generally supportive of their LGBT-identified children may feel ill equipped to provide support related to the health issues and psychosocial stressors experienced by LGBT individuals and therefore may need support in doing so. Future research should address the mechanisms behind this protective effect (e.g., positive responses to disclosures of identity) and whether other domains of social support compensate for lack of familial support.

We also found that bisexual identity was not associated with increased alcohol use in our sample. This finding is inconsistent with hypotheses and literature indicating that bisexuals are more likely to engage in a variety of risk behaviors compared with both heterosexual and gay/lesbian youth (Austin et al., 2004; Freedner et al., 2002; Marshal et al., 2009; McCabe et al., 2004; Russell et al., 2002; Saewyc et al., 2008; Williams et al., 2009; Ziyadeh et al., 2007);

but see Mustanski et al. (2010) for contradictory findings. Notably, the majority of these studies treated bisexuality as a stable construct and measured differences in risk using a measure of bisexuality from a single time point. Given that sexual orientation labels were highly variable over time in this and other studies of adolescents and young adults (Diamond, 2008; Savin-Williams and Diamond, 2000), a single snapshot of an individual's identity is likely to be influenced by a variety of third variables not accounted for in analyses, including developmental effects, environmental/contextual factors, and more stable personality characteristics.

Our finding that bisexual youth did not differ from gay/lesbian youth in alcohol use is likely more precise than that of most previous studies because we simultaneously evaluated bisexuality as a between- and within-persons effect to reduce the influence of third variable effects. It is also possible that having a bisexual identity no longer confers risk as a result of changes in societal attitudes toward the LGBT community. If it has become more acceptable for youth to express fluidity in sexual attraction, behavior, and self-adopted labels over time, then bisexual youth today may be less likely to experience the psychosocial stressors that once contributed to the development of risk behaviors (Saewyc et al., 2008).

It is important to acknowledge several limitations to the study design. Although the longitudinal design and diverse sample of the study are major strengths, we used a convenience sample that is not nationally representative, thus limiting the generalizability of our findings. However, nationally representative surveys do not assess constructs that are nuanced to the experiences of LGBT youth (e.g., sexual orientation-based victimization), which would render the current analyses impossible. We also were unable to make comparisons with heterosexual youth because our sample included only individuals who endorsed same-gender attractions. Future research should address whether our findings are in fact consistent with general adolescent samples by including a heterosexual comparison group.

We were unable to evaluate group differences in alcohol use for other racial groups (e.g., Hispanic/Latino LGBT youth) because of limited representation of these groups in our sample. Additionally, our between- and within-subjects measures of sexual orientation referred to self-reported identity labels, and results might have differed had we measured bisexuality in a more continuous fashion. We also acknowledge the important role that certain life transitions (e.g., going into/out of college and leaving family of origin) play in influencing drinking, but these analyses were beyond the scope of the current study.

Finally, this sample reported relatively low rates of drinking, which may be related to the age of the sample (only 34.9% had reached age 21 by the last time point) and the predominantly African American racial/ethnic composition. As the sample ages and we collect more data points, it will

be possible to delineate predictors of different trajectories of alcohol use across this important developmental transition into being able to legally purchase alcohol. We will also be able to observe the development of alcohol-related problems, which preliminary analyses found occurred at very low rates.

Despite these limitations, the current study provides crucial information about group-specific processes that confer or protect against risk for alcohol misuse in LGBT youth. The use of multilevel modeling techniques to simultaneously evaluate group differences, within-persons longitudinal effects, and the interactions between these variables was a crucial next step in determining which subgroups among LGBT youth are at increased risk for alcohol misuse and under what conditions. It is clear that there are a number of viable avenues for the development of clinical interventions that address alcohol misuse in this population. Our findings indicate that LGBT youth are not so different from heterosexual adolescents in their patterns of drinking, and adapting existing individual- and family-level interventions to the unique needs of LGBT youth will be both cost effective and efficacious in addressing problem drinking in these young people. Doing so could have profound implications for the health and well-being of LGBT youth and could open up a wider array of prevention and treatment options for this at-risk population.

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